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FOREST PEST MANAGEMENT

3430 BIOLOGICAL EVALUATION
R2-82-6

DWARF MISTLETOE
AND
MOUNTAIN PINE BEETLE
MIDDLE MOUNTAIN AND DIAMOND PEAK,
LITTLE SNAKE RESOURCE AREA,
BUREAU OF LAND MANAGEMENT, COLORADO
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DWARF MISTLETOE AND MOUNTAIN PINE BEETLE MIDDLE MOUNTAIN AND DIAMOND PEAK, LITTLE SNAKE RESOURCE AREA, BUREAU OF LAND MANAGEMENT, COLORADO 1982

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INTRODUCTION

At the request of the Little Snake Resource Area Office, Bureau of Land Management (BLM), Craig, Colorado, Dave Johnson, Supervisory Plant Pathologist, and George Downing, Assistant Director, Forest Pest Management, made a service trip to Middle Mountain and Diamond Peak in the northwest corner of Colorado.

Management activity has only recently been initiated in this area and the BLM has concerns regarding management of the lodgepole pine resource that is currently infested with lodgepole pine dwarf mistletoe, *Arceuthobium americanum,* and mountain pine beetle, *Dendroctonus ponderosae*.

On August 30, Dave and George met with K. C. Eberle, Forester, Little Snake Resource Area, and traveled to Middle Mountain. On August 31, they were joined by Bob Haburchak, Area Manager, and Ken McDowell, Wildlife Biologist, Craig District Office. A variety of stands of various age classes and condition were visited on Middle Mountain and management opportunities were discussed. On September 1, K. C., Dave and George visited several areas on the north side of Diamond Peak and discussed recent, current and proposed wood product sales. The following account generalizes the types of stands visited, condition and current insect and disease activity.

DESCRIPTION OF STANDS ON MIDDLE MOUNTAIN AND DIAMOND PEAK

The afternoon of August 31 was spent examining a recent broadcast burn area approximately 18 acres in size on the northwest face of Middle Mountain. This area was burned in July 1982 after dwarf mistletoe infected lodgepole pine had been felled. During our examination of the unit, aspen sprouts were noted throughout the area. Lodgepole pine should also regenerate the area, although it was too early to predict the success of natural regeneration.

Due to the presence of lodgepole pine dwarf mistletoe in many stands on Middle Mountain, it is suggested that clearcutting be utilized as the method to regenerate diseased stands in the future. The success of this broadcast burn emphasized that this is a reasonable method to manage these stands. In fact, since there has never been any management of stands on the mountain, many stands are in very poor condition as a result of overstocking and dwarf mistletoe infection. Evidence of past natural fires was abundant, however, most fires were not large enough or hot enough to kill infected trees, thus, when many stands regenerated naturally after fires, they were infected by residual overstory trees. Fires have also created a mosaic of small stands that are not economical to manage or administer.

The remainder of the afternoon was spent visiting stands of various age classes and condition. In general, most stands are infected by dwarf mistletoe and many of the larger diameter lodgepole pine have been killed or are currently infested by mountain pine beetle. The insect has been present in these stands for many years. An evaluation of the area had been made as early as 1970 (refer to Biological Evaluation - 5230, dated June 1970, by C. K. Lister).

It is expected that mountain pine beetle will continue to cause tree mortality in the future until the larger diameter trees are depleted. For the most part, the larger diameter trees are located along the ecotone and have relatively little value as sawtimber because of poor form and size. These trees do have value, however, as house logs and salvage sales are underway.

Other stands visited included deteriorating aspen clones that should be clearcut to promote vigorous sucker production; dense thickets of 35 year and older lodgepole pine that should be clearcut and regenerated because of dwarf mistletoe infection; pole size stands relatively free of dwarf mistletoe that should be thinned; and older post and pole size stands that should be harvested and regenerated. A recently constructed road has provided access to most of the stands on the top of the mountain.

A timber inventory of both Middle Mountain and Diamond Peak was completed within the past few years and the stand data analyzed by the Forest Pest Management Staff using RMYLD projections. It is thought that the projections are probably over-estimates of the volume that can be realized in these stands, particularly for Middle Mountain. The survey crew was not trained to recognize dwarf mistletoe and the dwarf mistletoe ratings for the stands are probably in error. Many of the stands on the north slope of Diamond Peak have relatively little dwarf mistletoe, thus the inventory data may be fairly reliable for this area.

Throughout the day, the question of the impact on large game from timber harvesting activity and removal of cover by clearcutting was raised by all concerned. Clearcuts within lodgepole pine and deteriorating aspen stands should be beneficial to most big game species, including elk and deer. In areas where it is desirable to retain forest cover and a mix of tree species is present, species not susceptible to lodgepole pine dwarf mistletoe infection (fir and spruce) could be retained during partial cuts. A greater diversity of tree species on the mountains would also be valuable for wildlife. It was evident that because of the absence of management in this area that most stands are too dense for wildlife use and no young stands were present because of wildfire control efforts within recent years. Wildlife would benefit from additional forage and the creation of "edge effect" along clearcut stands. Woods operators could be concentrated to minimize disturbance of wild game and roads could be closed during the critical calving times. Good forest management should not adversely impact wildlife; in fact, it was expressed that many wildlife benefits could be realized by proper management of the vegetation on the two mountains.

On September 1, K. C., Dave and George examined stands on Diamond Peak. There have been a number of small sales for posts, poles, mine props, house logs and fuelwood. Several stands visited had little or no dwarf mistletoe and would be good candidates for thinning.

On the average, the stands on Diamond Peak appeared to be of better quality and higher site index; however, these stands also needed management. Mountain pine beetle was active along the edges of stands in larger diameter trees. Some salvage of dead trees was underway.

Many stands on this mountain were relatively small in area and several stands of various age classes and size should be combined into larger units for administrative purposes and to control dwarf mistletoe spread in the future. We recommend 20 acres as the minimum size for clearcuts where dwarf mistletoe is a management concern. They should be regular in shape; narrow strips should be avoided. Cutting boundaries should be located to prevent spread of dwarf mistletoe from adjacent infected stands wherever possible.

A meeting was held at the Little Snake Resource Area Office the afternoon of September 1 with Ken McDowell and Herb Conley, Resource Area Wildlife Biologist, to review the findings of the group and develop a strategy for the future. It is recommended that a vegetative management plan for these areas be developed with input from resource specialists, including timber, wildlife, range, watershed and recreation. Timber management concerns have been voiced in the past and a program is underway; however, additional input from the other resources is now needed. The plan should address needs for several decades and serve as a source document for future planning of management activity and budgeting for those needs in a timely and orderly manner.

General Prescription for Management of Lodgepole Pine Stands on Middle Mountain and Diamond Peak

Lodgepole pine is best maintained as a vigorous, productive forest under an even-aged management system. Clearcutting is the most common method of converting old growth to managed stands; also a standard shelterwood system can be used where wind and pest problems permit.

Uneven-aged systems generally are not effective in ensuring natural regeneration of lodgepole pine or good growth of the replacement stand. Understory vegetation is negligible in dense stands with closed canopies. Periodic thinning increases the amount and composition of the understory.

Entire stands can be clearcut or shelterwood cut. The size of the opening that is likely to receive sufficient seed to revegetate the area is dependent upon whether the seed is dispersed by open or closed cones. Each stand must be examined to determine serotiny. Stands that are serotinous (closed cones) can be any shape or size since the seed supply is in slash-borne cones.

In stands that are non-serotinous or intermediate in cone habit, the cutting unit must be designed so seed from the clearcut edge reaches all parts of the opening, unless artificial regeneration is planned. For the Middle Mountain-Diamond Peak Area, managers are relying on natural regeneration. Where lodgepole has regenerated after clearcutting, stands are often overstocked and periodic entries should be planned for stocking control.

In stands infected with dwarf mistletoe, the overstory should be promptly removed as soon as regeneration is established (10-15 years after harvest).

Reasons for clearcutting lodgepole stands:

1. Lodgepole pine, a pioneer species, is shade intolerant and reproduces most satisfactorily when overstory competition is removed or drastically reduced.

2. Dwarf mistletoe, *Arceuthobium americanum,* is present in many mature and overmature stands. To limit the disease, clearcutting is often recommended.

3. Windfall is a threat to lodgepole pine stands.

Partial Cutting Practices

Shelterwood and group selection cuttings are applicable to old growth lodgepole pine stands where clearcutting is not an acceptable option. Also this method of cutting can be used to favor other more shade tolerant species, such as subalpine fir in the understory. Partial cutting requires careful marking of individual trees or groups of trees to be removed and close supervision of logging to prevent damage to the residual stand. Dwarf mistletoe infected trees should be discriminated against. The removal of large diameter, high risk trees (poor vigor, poor crown class) will also reduce mountain pine beetle activity in the area.

For single-storied stands where windfall risk is low, the first cut can remove 30 percent of the basal area (BA) on an individual tree basis. The initial entry is a preparatory cut since it does not open the stand sufficiently to obtain regeneration. Discriminate against poorest vigor trees.

The second entry should not be made for 5-10 years to determine windfirmness of the stand. This cut should remove 30 percent of the original basal area on an individual tree basis. This is a seed cut, so most vigorous dominants and codominants should be retained as a seed source. The last entry is the final harvest and should remove all remaining overstory. It should not be removed until sufficient reproduction is established.

Where windfall risk is moderate, the first cut should be limited to removal of 20 percent of the BA. Subsequent entries should be 20 percent of original BA. Where windfall risk is high, the stand should not be cut or limited to clearcutting in patches up to 5 acres interspersed with uncut areas.

Modification of Partial Cutting Practices Imposed by Dwarf Mistletoe

General statement on effects of dwarf mistletoe.

Dwarf mistletoes (*Arceuthobium* spp.) are serious parasites of conifers throughout the western United States. They reduce growth and yield, and often predispose their hosts to insect attack and premature death. Dwarf mistletoes are of primary concern to forest land managers in commercial timber producing areas. The chronic growth loss and deformation caused by dwarf mistletoes is important in these areas. Studies made of virgin mature stands in Colorado and Wyoming show that heavily infected stands had about half the board foot volume and twice the mortality rate of uninfected stands on the same sites. The average per acre volume for all infected stands was about one-third that of healthy stands.

Infection of regeneration results in badly deformed trees and early death. Dwarf mistletoe treatment must be integrated into long term vegetation management planning.

Partial cut only in stands where the average dwarf mistletoe rating (DMR) is 2 or less (70% or less of trees infected). Remove high risk trees. The final overstory removal can be delayed until the new regeneration is 10-15 years old. To minimize infection of the new regeneration, the overstory should be removed as soon as possible. The new stand should be sanitized on subsequent entries.

In old-growth stands where the average DMR is greater than 2, any partial cutting will intensify the infection. In these stands, the stand should be clearcut or not cut at all. Any partial cut should remove sufficient BA to establish regeneration. All residual trees should be removed within 10-15 years and the young stand sanitized.

When treating stands, the creation of buffer strips should be considered at the margins of dwarf mistletoe infestations to prevent spread into or out of the treated areas. Buffers can consist of naturally occurring barriers to spread (meadows, roads, changes in tree species); type conversion, by removal of susceptible species and regeneration with nonsusceptible species; and clearcut strips.

SUMMARY AND RECOMMENDATIONS

The Middle Mountain-Diamond Peak area in northwest Colorado is currently infested by lodgepole pine dwarf mistletoe and mountain pine beetle. It is expected that these pests will continue to cause tree mortality until these stands are placed under management. The current sale activity in the area has helped to develop access to many stands; however, a larger scale, more aggressive program of multiple product removal is needed to intensify management and reduce the effects of these major pests.

It is recommended that a vegetative management plan be developed for the area that addresses all resource concerns. Input from timber, wildlife, range, watershed and recreation specialists is needed. This plan would serve as a source document for planning activities over the next several decades and provide for vegetative management in a manner such that major forest pest activity will be reduced to acceptable levels.

REFERENCES

Alexander, R. R. 1975. Partial cutting in old-growth lodgepole pine. USDA Forest Service Research Paper RM-136, 17pp.

Alexander, R. R. and C. B. Edminster. 1980. Lodgepole pine management in the central Rocky Mountains. Journal of Forestry 78(4):196-201.

Alexander, R. R. and C. B. Edminster. 1981. Management of lodgepole pine in even-aged stands in the central Rocky Mountains. USDA Forest Service Research Paper RM-229, 11pp.

Hawksworth, F. G. 1977. The 6-class dwarf mistletoe rating system. USDA Forest Service General Tech. Report RM-48, 7pp.

Lister, C. K. 1970. Biological evaluation, mountain pine beetle, B.L.M., Craig District. June 1970. UDSA Forest Service, Forest Pest Control, Rocky Mountain Region, Office memo 5230, 2pp.